ZIMMATIC™

BY LINDSAY

9500CC

Operation Manual

P/N 1239680 Rev B (ECN 34225)

Lindsay Manufacturing Company
P.O. Box 156
214 East Second Street
Lindsay, NE 68644

Dear Purchaser:

Congratulations on your recent investment in a new Zimmatic Custom Corner. By choosing Zimmatic equipment, you will experience the finest in automated irrigation machinery designed to save water, energy and labor.

In order to use the Custom Corner to its fullest potential, it is important that you fully understand how to operate and maintain the machine. Please carefully read the material contained in this manual which thoroughly explains proper machine operation, upkeep and safety procedures. To ensure years of reliable and safe service from your Zimmatic machine, I encourage you to follow these recommendations closely.

At Lindsay, safety is our number one concern. Each operator should take the time to carefully read the safety information in this manual. Please pay particular attention to, and follow all safety precautions and warnings. In addition, please adhere to the information displayed on all safety decals in various locations on the equipment. Should you have any questions regarding operation, safety or maintenance of your new Zimmatic Custom Corner, please contact your servicing Lindsay Dealer.

Customer satisfaction is very important to us at Lindsay. By following the guidelines established in this manual, we are confident you will experience many seasons of productive service from your Zimmatic machine. If you have any suggestions or comments regarding the operation of our equipment, we encourage you to submit your feedback at www.zimmatic.com.

Thank you for choosing Zimmatic equipment.

Chris Higgins
Zimmatic Product Manager

Table of Contents

General Safety Instructions

WARNING

Personal Safety: Throughout this manual and on all safety signs, the precautionary statements (**"DANGER"**, **"WARNING"**, **"CAUTION"** and **"NOTICE"**) can be found, followed by a hazard description and preventative actions to be taken. These precautions are intended for the personal safety of the operator and those within the vicinity of the machinery. Please take time to read these precautions.

Hazard Severity Panels			
Background Color of Panel	**Contrast Color**	**Meaning/Use**	**Hazard Severity Panel Illustration**
Red	White	Indicates a hazardous situation, that, if not avoided, will result in death or serious injury.	
Orange	Black	Indicates a hazardous situation, that, if not avoided, could result in death or serious injury.	
Yellow	Black	Indicates a hazardous situation, that, if not avoided, could result in minor or moderate injury.	
Blue	White	Indicates information considered important, but not hazard-related (e.g. messages relating to property damage).	

NOTICE

Machine Integrity: Additional precautionary statements (**"ATTENTION"** and **"IMPORTANT"**) are intended for machine integrity and are followed by specific instructions.

ATTENTION: The word **"ATTENTION"** is used to warn the operator of potential machine damage if a certain procedure is not followed.

IMPORTANT: The word **"IMPORTANT"** is used to provide the reader with information necessary to prevent minor machine damage if a certain procedure is not followed.

WARNING!

Qualified Technicians Only: All maintenance and service must be performed by a Lindsay Dealer. Failure to comply can result in damage to property and machinery, and cause injury or death to personnel.

WARNING!

Lock Out/Tag Out: Disconnect all sources of energy and lock out machine before doing any maintenance or repairs to the machine. Proper Lock Out procedures will prevent the energy source from starting the machine or allowing parts to move unexpectedly as well as prevent the machinery from being accidentally turned on or restarted. Shut off and Lock Out all sources of potential or kinetic energy. These may include, but are not limited to, electrical, mechanical or hydro energy sources.

Lock Out is a procedure used for placing an actual locking device on the power source, preventing unexpected start up or accidental release of energy. Lock Out is the preferred method of accident prevention.

Tag Out procedure is used when the power can not be disconnected. Tag Out does not shut down the power source, Tag Out only provides a warning about the danger of activating the machine.

Never try to operate machinery that is locked out or tagged out. Never attempt to remove these locks or tags on machinery. Doing so will result in injury to personnel working on the machine. Only the initiator of the Lock Out or Tag Out procedure may remove locks and tags.

Sometimes it may be necessary to energize the system to test or position equipment during maintenance or repair. Such application must be performed only by a qualified technician and all Lock Out removal steps must be followed before power is turned on.

WARNING!

Main Disconnect: The main power disconnect is located at the main service breaker or generator. The disconnect at the panel is not the main disconnect. A fuseable service disconnect device must be placed previous to this panel with the fuses sized for the load being supplied and installed in accordance to NEC codes.

It is important to understand the differences between the Pivot Enable switch (if installed), High Voltage On/Off switch and the service breaker On/Off throw switch.

The power company service disconnect provides the ability to turn off or return full service to the equipment from the power company service line. This switch must be turned off and locked out when performing maintenance and repairs on the system.

The High Voltage On/Off provides the ability to turn off or return power to the equipment from the service disconnect. This switch must be turned off and locked out in conjunction with the service disconnect switch. The High Voltage switch only disconnects the power in the control panel, as energy is still coming in from the main power line.

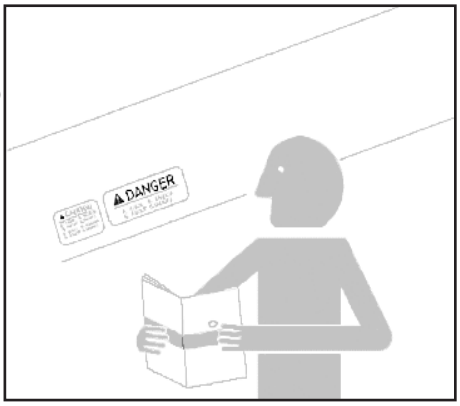
The Pivot Enable switch (if installed) provides power to the system controls. When enabled, the entire system and the controls will power up. When turned off, the controls and system will not be energized. However, there will be power in the panel circuitry. The Pivot Enable switch is **NOT** a disconnect and should not be treated as such.

WARNING!

Proper Training: All individuals involved in the installation, operation or maintenance of this equipment must receive and understand training in the safe and proper methods of performing all duties assigned to them at the time of the initial assignment and at least annually thereafter. Safety messages and appropriate response procedures to emergencies or other situations which may arise should be fully understood.

WARNING!

Follow Safety Instructions: Carefully read all safety messages in this manual and safety signs on the machinery. Keep safety signs in legible condition. Replace any missing or damaged safety signs.



Learn how to operate the machine and controls properly. Do not allow anyone to operate the machinery without proper instructions.

Keep the machine in proper working condition. Only have the machine serviced by a trained service technician on a routine basis. Unauthorized modifications to the machine may void the warranty, impair machine function and/or safety and reduce the life of the machine.

CAUTION

Practice Safe Maintenance: Understand maintenance procedures before doing work.

Always follow proper Lock Out/Tag Out procedures before performing any maintenance.

Never lubricate or service machine while it is moving. Keep hands, feet and loose clothing from power-driven parts. Disengage all power and operator controls to relieve pressure. Allow all heat-generating units to cool.

Keep all parts in good condition. Remove any build up of grease, oil and debris. Ensure that all parts have been properly installed by a certified technician.

Tower alignment, pressure switch adjustment and tower control switch adjustment must be performed by a qualified service technician.

WARNING!

Electric Shock: Follow these precautions to prevent serious injury or death.

DO NOT allow moisture to enter the main panel. Moisture can allow voltage to conduct across surfaces, creating a shock potential.

Dangerous voltage potential may be present at lightning arrester. Visually inspect arrester before each operation. If lightning arrester shows signs of impairment, contact a Lindsay Dealer.

WARNING!

Electrical Connections: Keep all sparks and flames away from all wet cell batteries (where used), as gases given off by electrolyte are explosive. Avoid sparks by connecting the ground cable last and disconnecting it first.

WARNING!

Inspecting the System Prior to Operation: Always inspect the system before operation. If the system appears impaired, do not operate the machinery and contact a Lindsay Dealer.

CAUTION

Area Lighting: The owner shall provide area lighting as may be required. Improper lighting can lead to visual impairment and cause injury to personnel and damage equipment.

WARNING!

Noise Protection:

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against uncomfortably loud noises.

The A-weighted emission sound pressure level at the pivot point does not exceed 70 dB.

WARNING!

Slope Limitations: Never exceed the slope/ridge limitations specified for this machine (see Slope Ridge Limitations in Section 1- Specifications of this manual). Exceeding these limitations can result in serious injury or death due to the instability of the system if loaded or exposed to high wind along a steep slope.

CAUTION

Use Lindsay Parts: Ensure that only Genuine Lindsay Parts are used on the system. Using modified or third-party vendor parts can result in ill-fitting components, resulting in premature part or system failure and void warranty claims.

WARNING!

Overhead Maintenance: Overhead maintenance should be performed by a Lindsay Dealer, using a proper personnel lift device.

To prevent injury or death from falling, never attempt to climb on an irrigation machine for any reason.

WARNING!

Overhead Power Lines: Make certain the irrigation system will not come in contact with or come within close proximity to power poles or power lines. Check with the local power company for assistance in determining the minimum clearance from power lines necessary to prevent any risk of injury or damage to the power lines. The irrigation stream should not wet any overhead power lines.

When towing the system, avoid power lines!

CAUTION

Crop Clearance: Make sure the crop does not interfere with the system structure. Crops can bind up in moving parts and jam the drivelines, causing sever damage to the tower drive system. Keep crops clear of the irrigator tracks.

WARNING!
Tire Pressure: Always maintain the correct tire pressure. Do not over-inflate the tires above the recommended pressure. Too low of pressure will result in the tire slipping off the rim.

Inspect the tires and wheels regularly. Do not operate with impaired tires.

NOTICE:
Check to see that lug nuts are tightened to 120 ft./lbs. Check regularly for tightness.

WARNING!
Lifting Components: Extreme care is needed for lifting components during installation/assembly. Only a Lindsay Dealer using the proper lifting equipment may perform this task.

Use caution when lifting heavy objects. Components weighing in excess of 50 lbs. (22.7 kg.) must be lifted with the assistance of another individual or mechanical lifting device.

Do not work or stand under system or components during assembly. Due to the weights involved, severe injury or death can result if components should fall.

WARNING!
Dismantling the System: If it is ever necessary to dismantle a Zimmatic System, extreme care must be taken to prevent damaging or dropping parts. As with installation and assembly, dismantling must only be performed by a Lindsay Dealer.

WARNING!
Chemical Handling: Agricultural chemicals can be extremely poisonous or explosive. Improper selection or use of chemicals can injure persons, animals, plants, soils, or other property. Handle and apply chemicals with care. Follow instructions of the chemical manufacturer. Certain chemicals may be subject to state and federal emergency release notification requirements. Please consult the local or national safety authority for applicability.

CAUTION
Wear Proper PPE: Always wear appropriate Personal Protective Equipment (PPE) for the task being performed. At a MINIMUM, the following are required equipment:

Ear Protection:
Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear a suitable hearing protective device such as earmuffs or earplugs to protect against uncomfortably loud noises.

Eye Protection:
Sharp Objects, Debris and explosions can cause severe eye damage or blindness. Wear Safety Standard approved eye protection that fully shields the eyes.

Foot Protection:
Prevent damage from falling or dropped objects on the feet by wearing steel-toe shoes/boots with metatarsal protection.

Head Protection:
Prevent damage from falling or dropped objects on the head by wearing proper head protection.

CAUTION

Prepare for Emergencies: Be prepared for any emergency that may occur. Keep emergency numbers for doctors, hospital, ambulance service and fire department near your telephone.

The following symbols indicate grounding connections that can be found on irrigation systems..

Earth Ground

Protective Earth Ground

Frame or Chassis Ground

9500CC Safety

WARNING

Main Disconnect; The 9500CC Control Panel is not the main source disconnect for the system. The main disconnect is at the main control panel.

CAUTION

Grounding of the Equipment; This equipment utilizes controlled overvoltage equipment techniques that grounds the equipment should normal mode AC voltages or transient voltages be present. The panel internal components are grounded via the input cable provided ground wires.

CAUTION

Welding on the System; If it is necessary to weld or cut with an electric arc welder on this system, the welding equipment must be properly grounded and all electrical power to the irrigator be disconnected or severe damage to the electronic computer circuitry can result.

CAUTION

Electrostatic Discharge; This equipment contains electrostatic discharge (ESD) sensitive components. ESD sensitive components must be handled in the following manner to avoid damaging them:

- Personnel must wear a grounding strap or similar grounding device using a 1 mega ohm series resistor for equipment protection against static discharge and personal protection against static shock.

Failure to protect from ESD can cause permanent damage to components causing immediate or gradual component failure.

Technical Specifications

9500CC Processor Panel, GPS
Part No. 1491700
380/400/415/480 V 30 Amp
3Φ 50-60 Hz
Largest Motor Full Load: 4.0 Amp
Total Full Load: 12.0 Amp
Weight: 100 lbs (45,4 kg)
Size: 24” H x 25” L x 8-1/2” W

Environmental Ratings
Operating Temperature: -0 to 40 C
Storage Temperature: -40 to 75 C
Class 3R, IP 44 Rated
Relative Humidity: Non-Condensing, 85% inside the enclosure
Altitude: 2000m
Pollution Degree: 2
Standards:

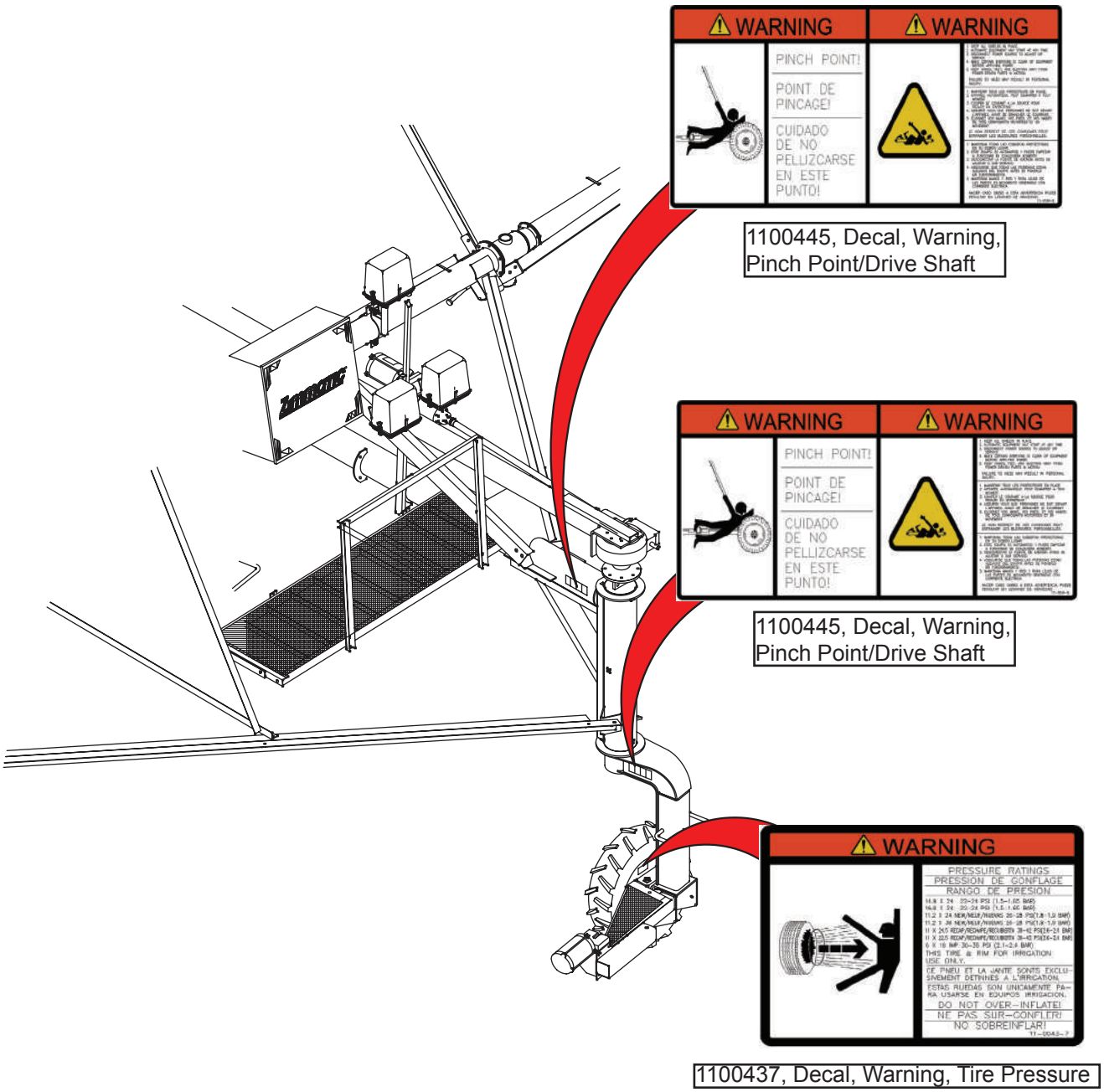
EN 60204-1:2006/AC:2010
EN 909:1998+A1:2009
EN 61000-6-2:2005
EN 61000-6-3:2007
ETSI EN 301 489-1 V1.9.2
ETSI EN 301 489-7 V1.3.1
EN 60529:1992+A2:2013
IEC 61000-4-2, -3, -4, -5, -6, -8, -11
IEC CISPR 11
FCC Part 15

WARNING

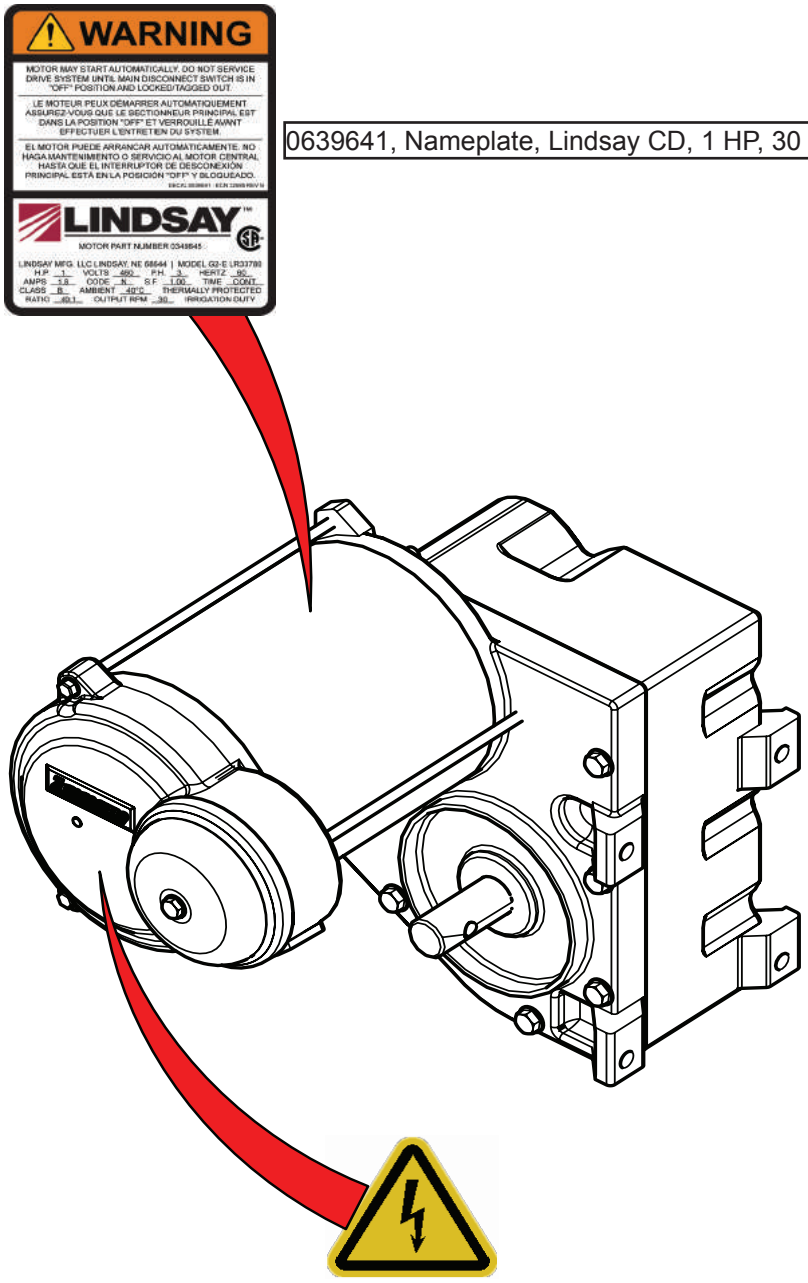
Safety Signs; The following safety signs have been placed on the system as shown. These signs are intended for the personal safety of all who operate this machinery. Please take the time to walk around the machine, with this manual, and note the location and content of each safety sign.

Keep the safety signs legible. If safety signs become damaged or lost, obtain replacements from your Lindsay Dealer.

9500CC Tower



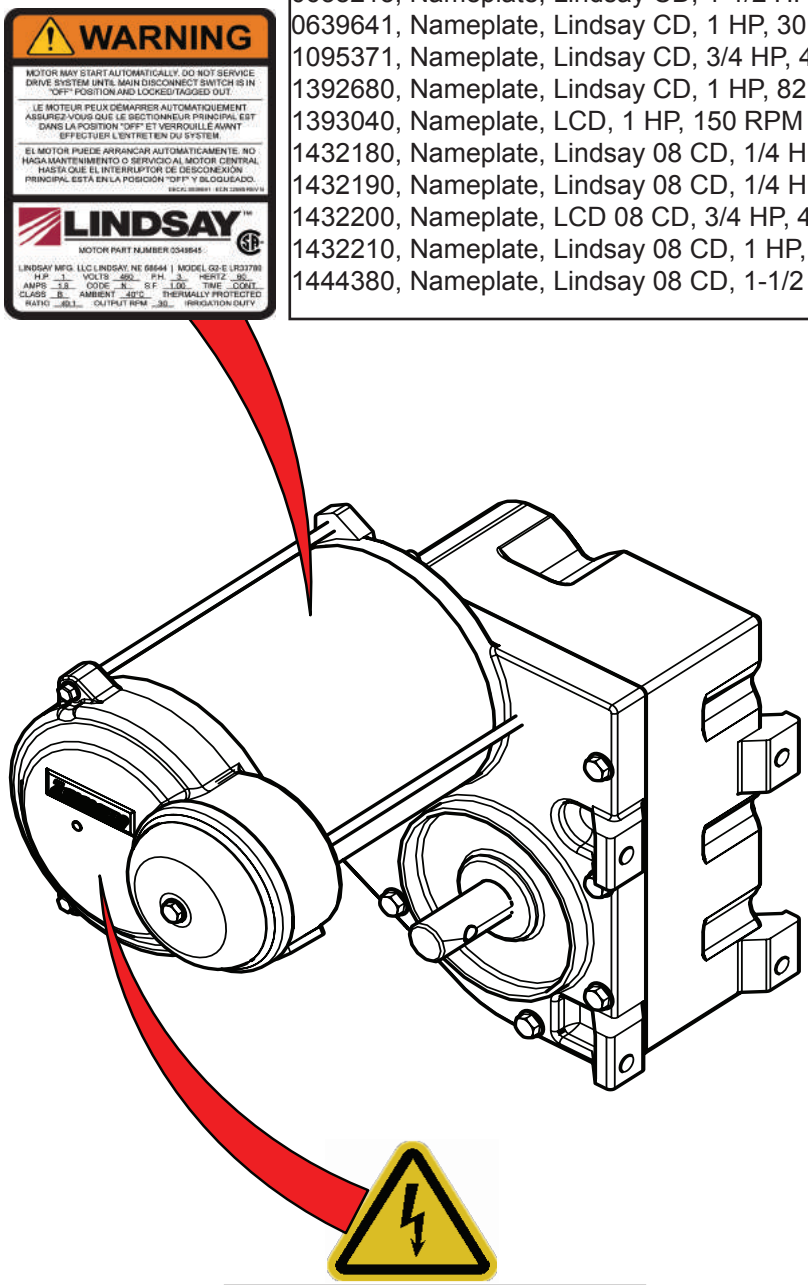
Steering Drive Unit



0639641, Nameplate, Lindsay CD, 1 HP, 30 RPM

1173541
Decal, Electric Shock/Electrocution

Center Drive Unit

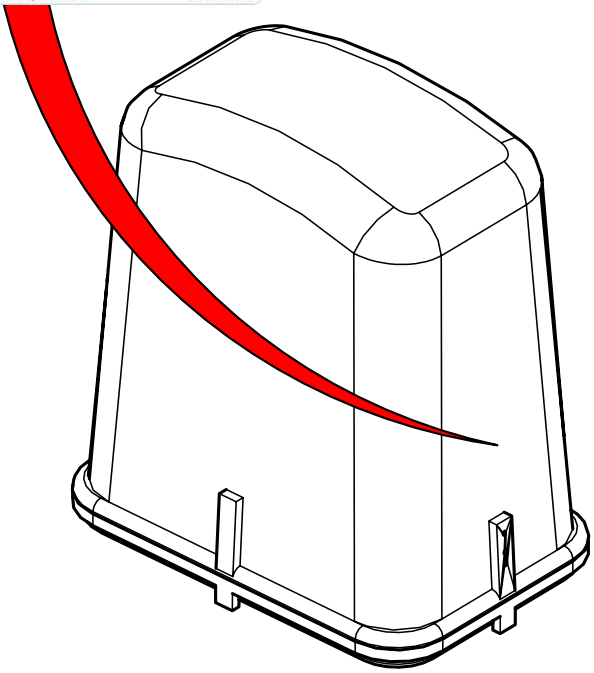


0638213, Nameplate, Lindsay CD, 1-1/2 HP, 86 RPM
0639641, Nameplate, Lindsay CD, 1 HP, 30 RPM
1095371, Nameplate, Lindsay CD, 3/4 HP, 43 RPM, 380V
1392680, Nameplate, Lindsay CD, 1 HP, 82 RPM
1393040, Nameplate, LCD, 1 HP, 150 RPM
1432180, Nameplate, Lindsay 08 CD, 1/4 HP, 43 RPM
1432190, Nameplate, Lindsay 08 CD, 1/4 HP, 59 RPM
1432200, Nameplate, LCD 08 CD, 3/4 HP, 43 RPM, 380V
1432210, Nameplate, Lindsay 08 CD, 1 HP, 59 RPM
1444380, Nameplate, Lindsay 08 CD, 1-1/2 HP, 86 RPM

1173541
Decal, Electric Shock/Electrocution

Collector Ring Junction Panel

1603279
Decal, Product ID, Collector Ring Junction Panel



Standard Tower Control Panel

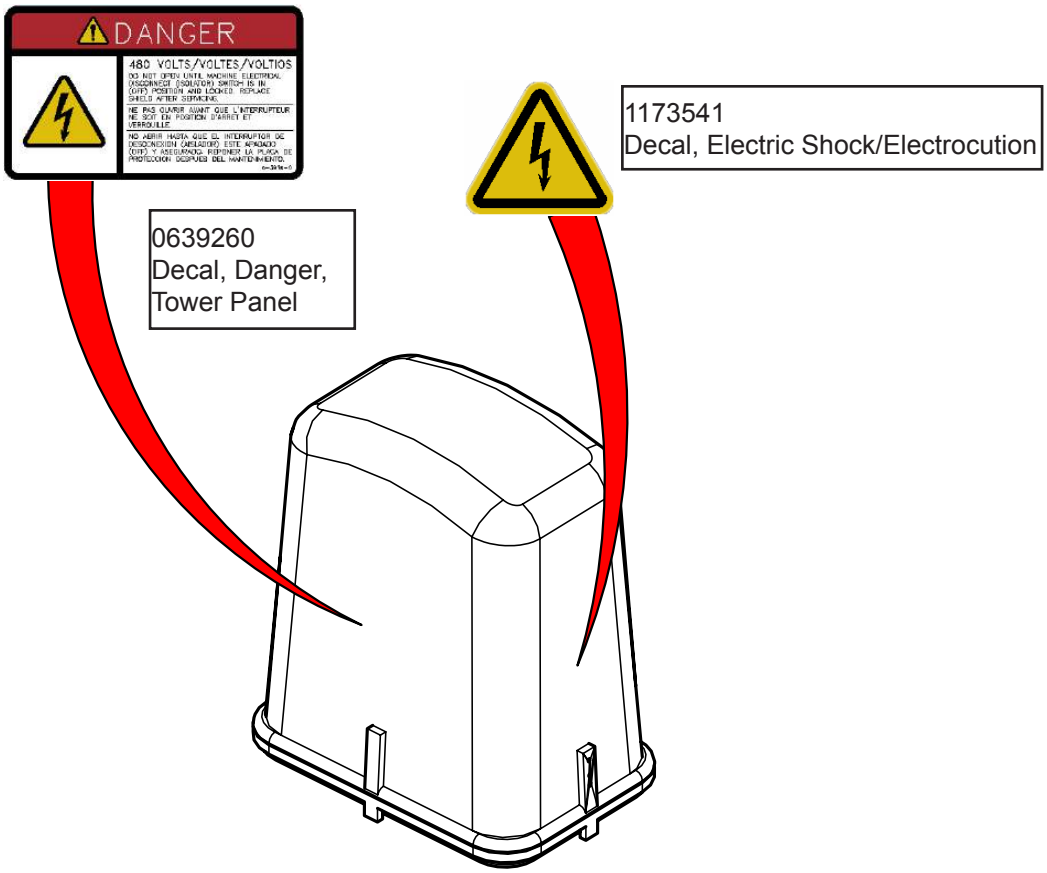
Next-to-Last Tower Panel

Transmitter Panel, Pivot

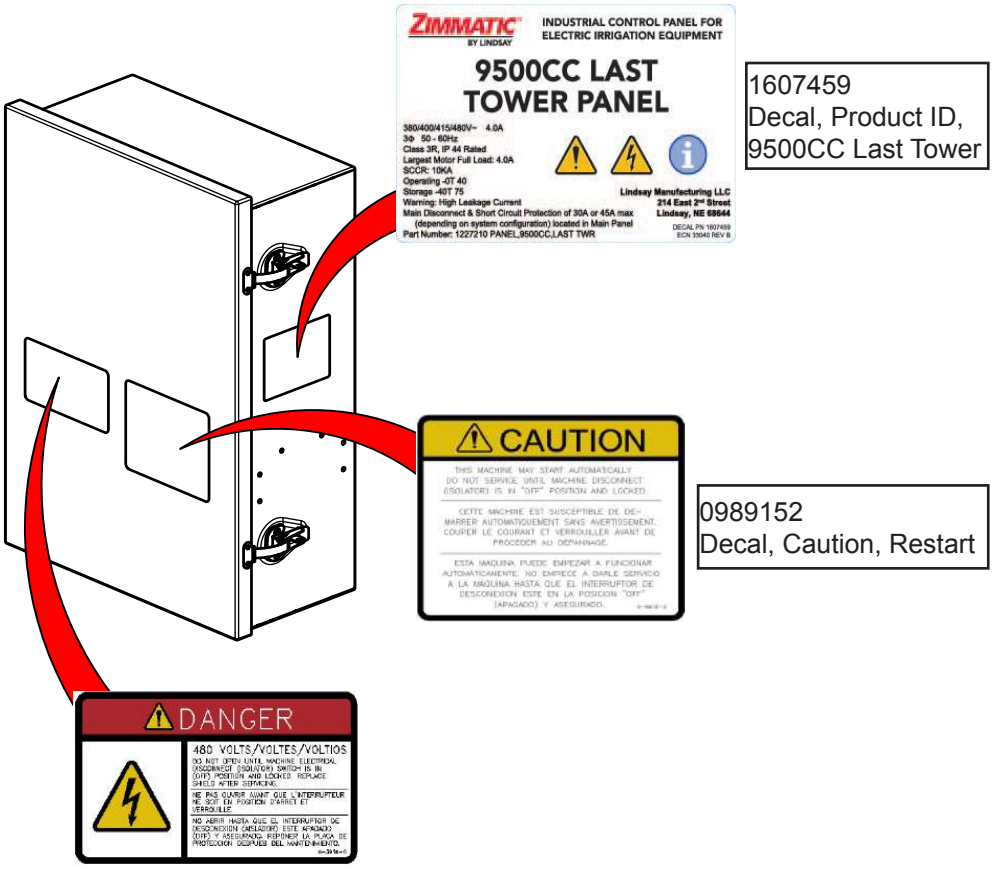
Transmitter Panel, 1st Tower

Line Reactor Panel

Sequencer Panels



Last Tower Panel

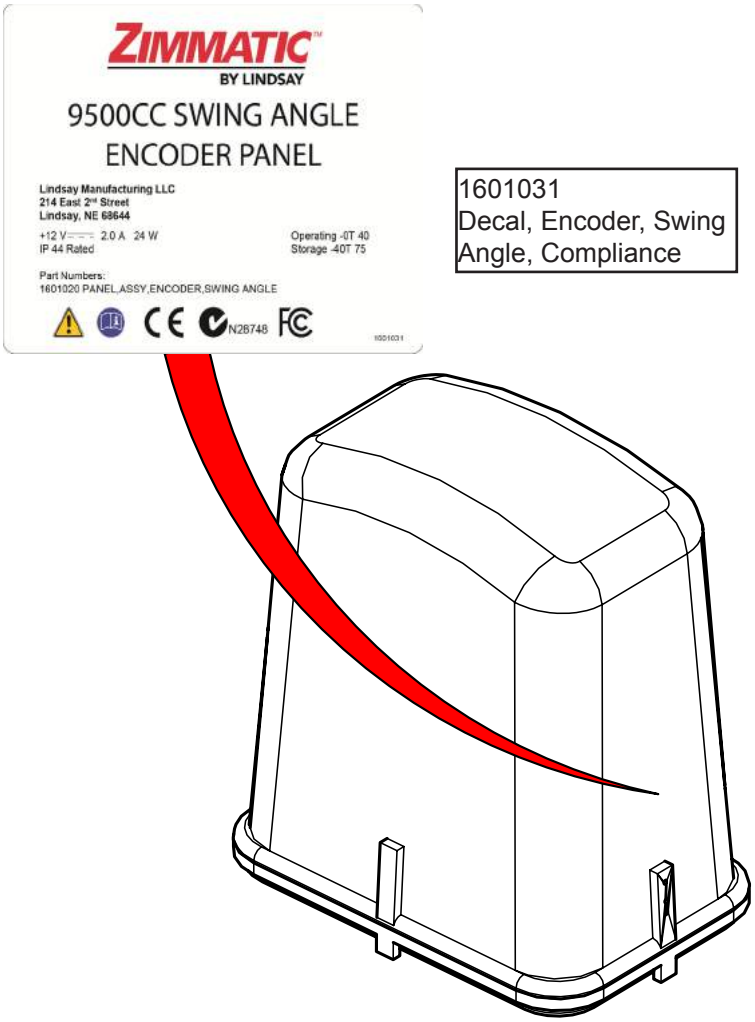


1607459
Decal, Product ID, 9500CC Last Tower

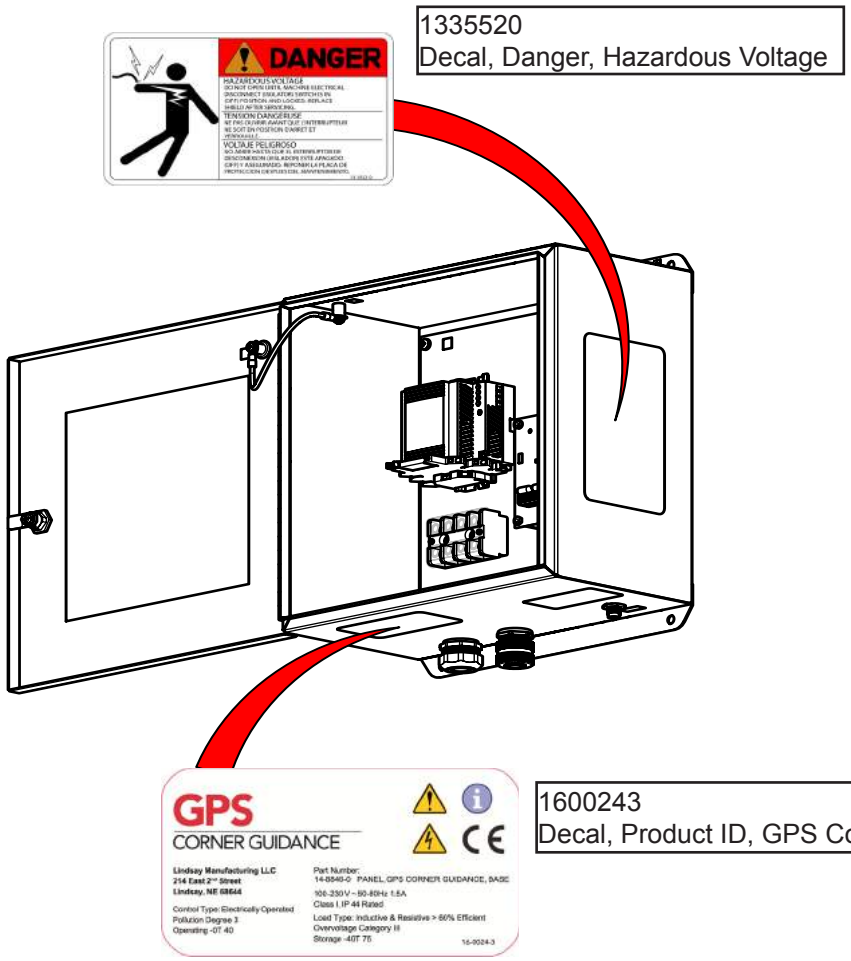
0989152
Decal, Caution, Restart

0639260
Decal, Danger, Tower Panel

Swing Angle Encoder Panel

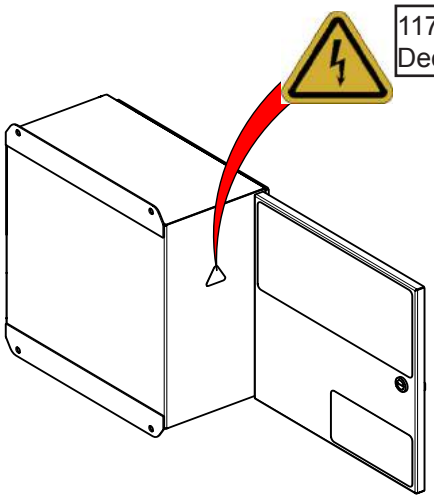


GPS Guidance Base Panel



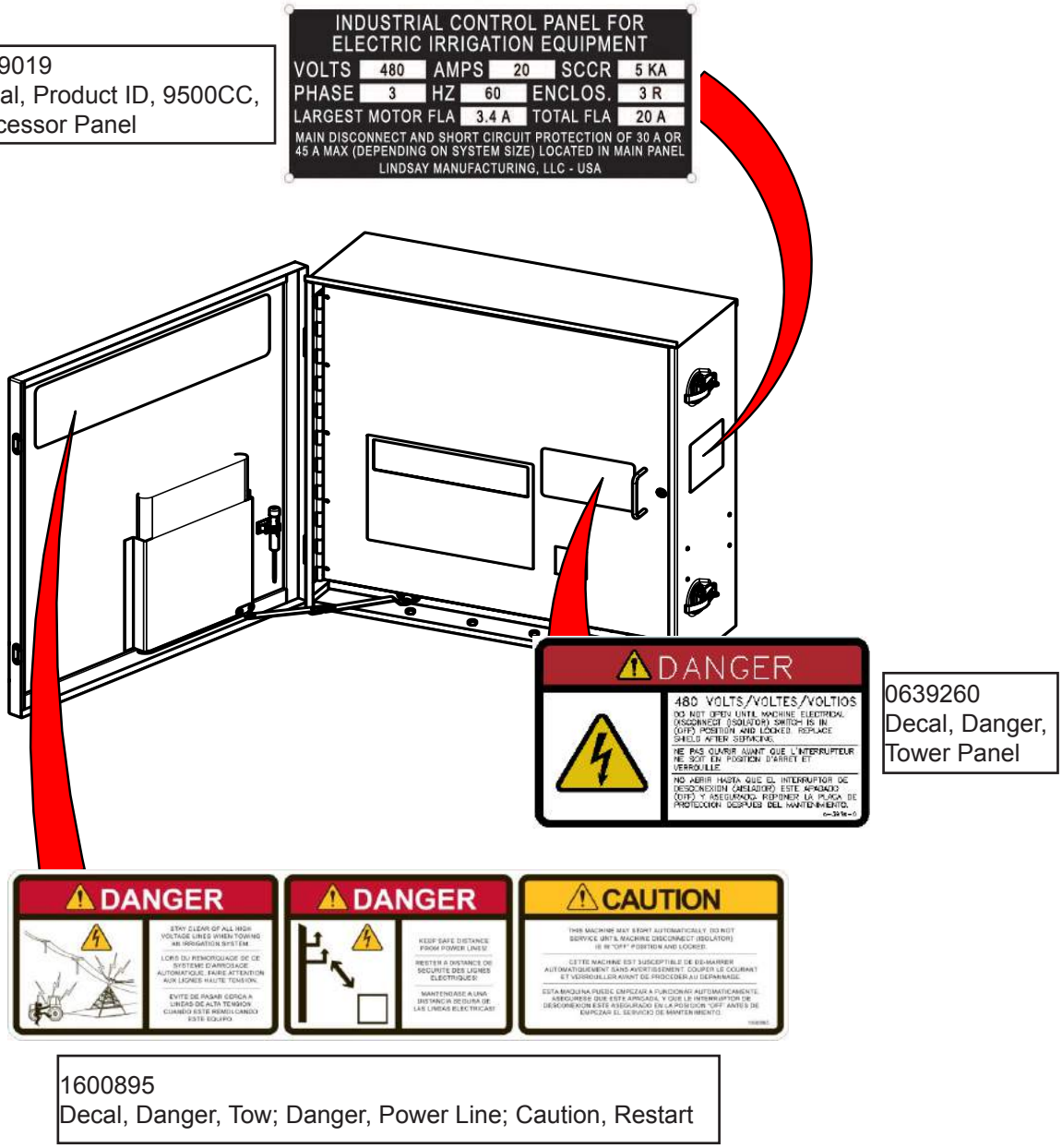
1335520
Decal, Danger, Hazardous Voltage

1600243
Decal, Product ID, GPS Corner Base



1173541
Decal, Electric Shock/Electrocution

9500CC Processor Panel

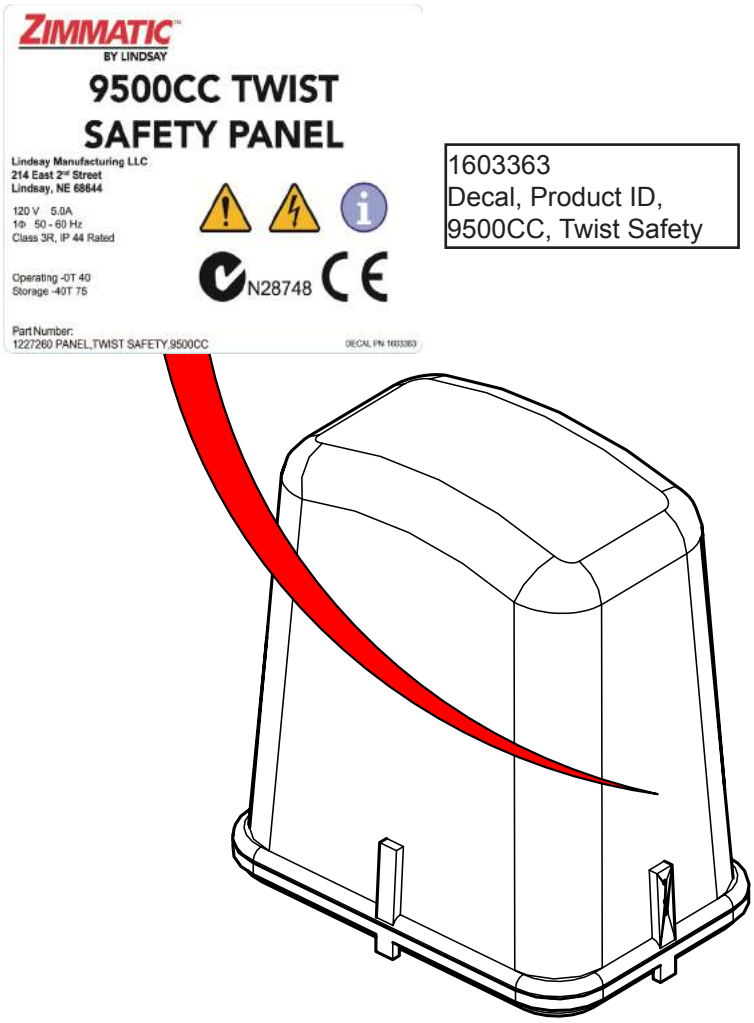


1609019
Decal, Product ID, 9500CC, Processor Panel

0639260
Decal, Danger, Tower Panel

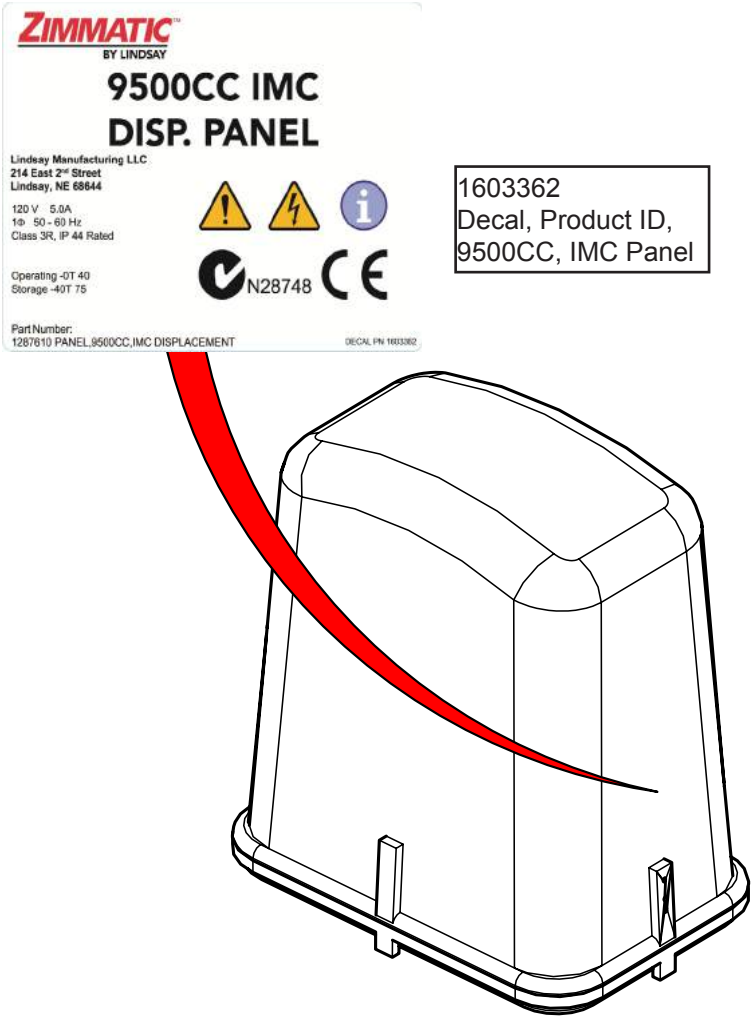
1600895
Decal, Danger, Tow; Danger, Power Line; Caution, Restart

Twist Safety Panel



1603363
Decal, Product ID,
9500CC, Twist Safety

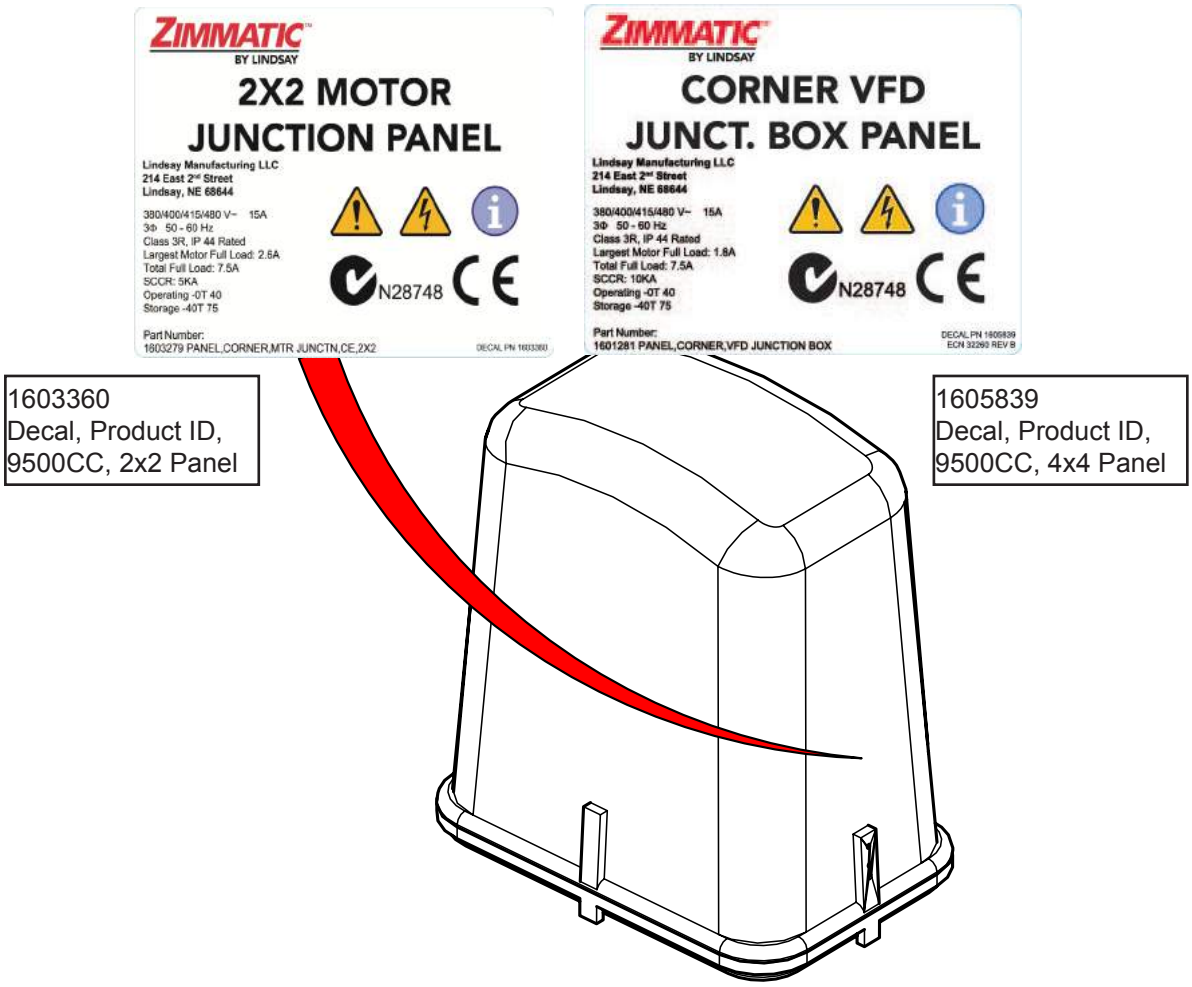
IMC Displacement Panel



1603362
Decal, Product ID,
9500CC, IMC Panel

2x2 Motor Junction Box Panel

4x4 Motor Junction Box Panel



1603360
Decal, Product ID,
9500CC, 2x2 Panel

1605839
Decal, Product ID,
9500CC, 4x4 Panel

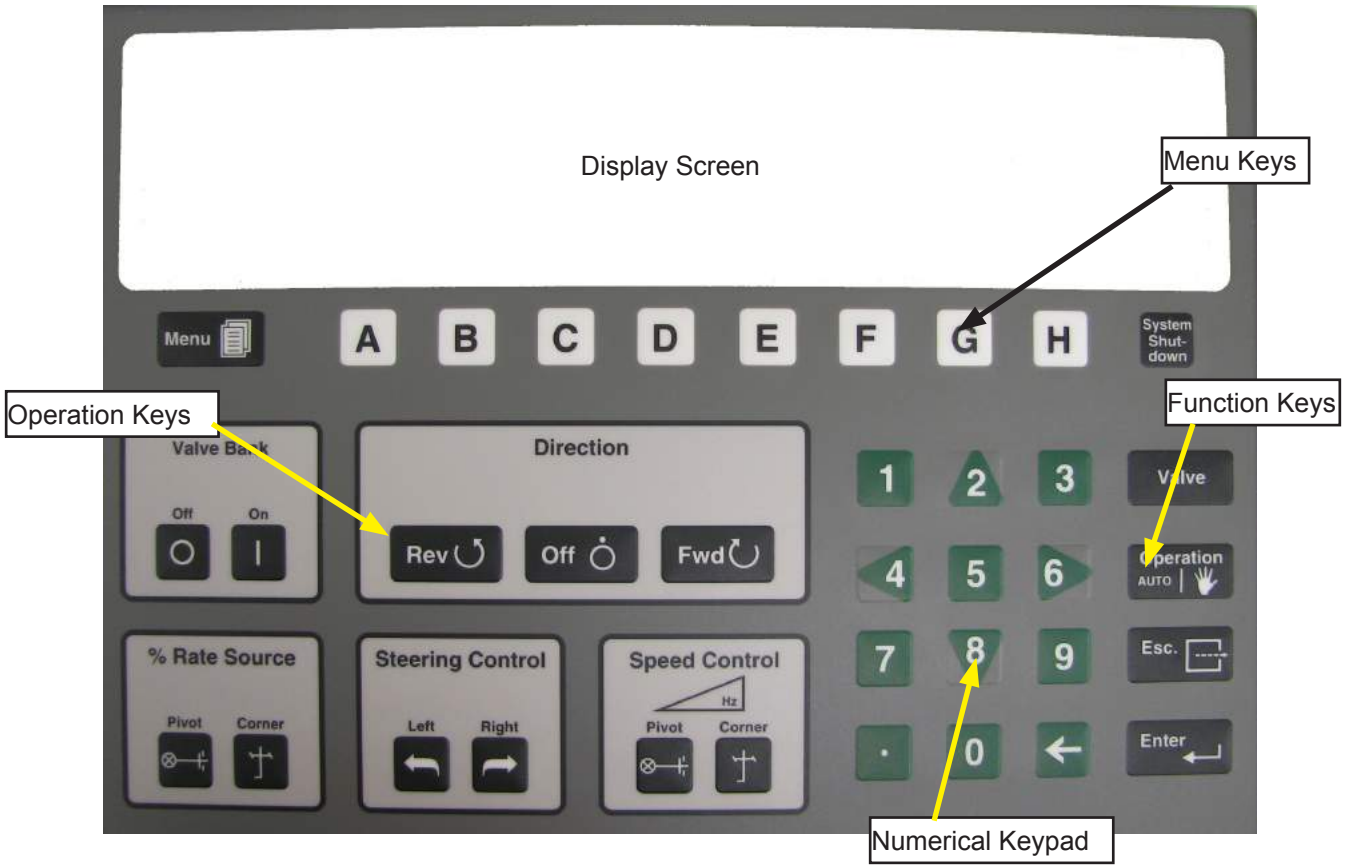
Section 1 – Operation

9500CC Operation

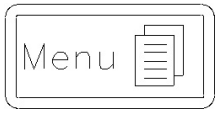
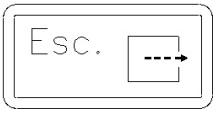
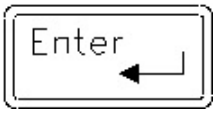
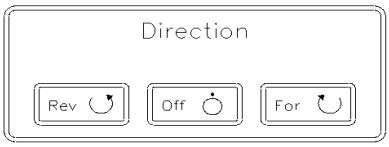
Zimmatic pivots with the 9500CC system are operated the same way as a standard pivot from the main pivot panel.

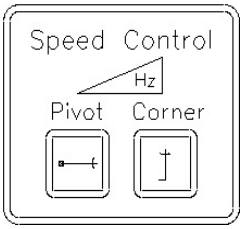
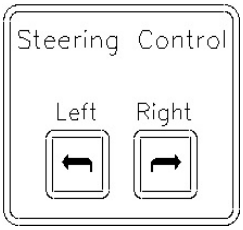
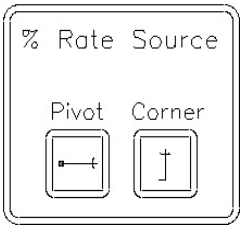
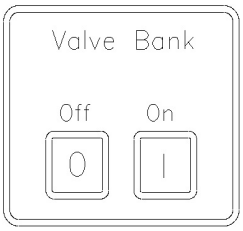
9500CC Processor Panel

Panel Component Identification and Operation



NOTE: Reverse and Forward Direction keys are not used
Speed Control keys are not used
Auto/Manual Operation key is not used

Key	Description
	**Menu** Pressing this key will return to the Program Menu.
	**System Safety Shutdown** If this key is pressed and held down for at least 2 seconds, the safety circuit of the pivot will open.
	**Valve** This key is used as a maintenance function to turn the valves from the normal water pattern to off.
	**Auto Manual Key** Not used at this time.
	**Escape Key** The ESCAPE key will return to the previous menu.
	**Enter Key** When certain screens require a number or letter choice, the ENTER key finalizes the entry.
	**Manual Direction** The OFF key is active in Auto, Semi-Auto and GPS modes. The OFF key puts the last tower in standby mode. When pressed again, the last tower will start. The REVERSE and FORWARD keys are not active at this time.

Key	Description
	**Speed Control** Not used at this time.
	**Manual Steering Control** The LEFT-RIGHT keys for steering are active during Manual and Semi-Auto modes. The operator must manually press the appropriate key to steer the wheels of the tower in the corresponding direction. The tower will continue to steer as long as the key is pressed.
	**Percentage Input Control** The percentage input control keys allow the operator to change the percentage rate at the corner panel. The default mode is PVT% (pivot) at startup. The percent rate can be changed manually for service use by pressing the COR (corner) key. This does not affect the pivot point percent rate. The corner processor simply ignores the percent timer signal from the pivot panel in this mode. The PVT% on the LCD screen will change to COR%. The operator can now enter in a new percent rate for the system to run at. The COR% will flash on and off to remind the operator that the percent rate is not being controlled from the pivot point. Pressing PVT key will return the percent rate control back to the pivot point panel. **Reminder:** The default percentage rate is from the pivot point percent timer. If the corner panel is left in the COR% control mode, it will default back to PVT% when restarting the system or at an Auto-Reverse. **Note:** If any work is done on the corner system, take care to put the percentage input control back in the PIVOT position. This will enable the operator to control the entire sytem speed from the main panel at the pivot point.
	**Valve Bank** The valve bank keys are used in conjunction with the valve bank menu.

9500CC Panel Setup

Main Menu

The Main Menu screen displays the following information.

```
MOD:AUTO  ROT:FWD STR:RIGHT -  -FWD-  -REV-
PVT%: 0.0%  PAT:Std.  201 0 R  2.00   2.00
PIVOT: 0.0   SA:0.00  92.6° A  0.00   0.00
STEER: 0.0  DIS: 56.4° ←→  O  0.02  -0.01
```

Description of Displays:

DIS:	Displacement Percent tension <> or compensation >< of the Swing Arm Span
MOD:	Mode of Operation
ROT:	Direction of Rotation
STR:	Direction of Steering
PVT%:	Percent Rate
PAT:	Current Water Pattern being used
PIVOT:	Frequency the VFD on the Main System is running
STEER:	Frequency the VFD on the Steering Tower is running
SA:	Swing Angle voltage and corresponding angle degrees
R:	Reference Voltage of the FWD (forward) and REV (reverse) antennas
A:	Angle Voltage of the FWD and REV antennas
O:	Offset Voltage of the FWD and REV antennas

Program Menu

Press Menu to display the Program Menu.

```
A>SET DATE              E>EVENT LOG
B>WATER PATTERNS        F>CLOCK AND TIMERS
C>STEERABLE SETUP       G>TRAINING
D>BOSS                  H>DIAGNOSTICS
```

Each letter refers to the appropriate menu key. Pressing a given menu key will open the listed menu.

Start Up Menu

Press A when at the Program Menu to access the Start Up Menu.

```
STARTUP MENU:
A>SEMI MODE
B>DELAY: 5 SEC.
C>PERCENT RATE: 25%
```

Operation:
A- SEMI-MODE: Requires the dealer or service technician to enter a password in order to access the Mode function.
B- DELAY: Upon startup the system will delay for this many seconds between the time power is applied and the system will actually begin to operate. (Default value is 10 seconds.)
C- PERCENT RATE: In Auto Mode, the system will operate at this percent rate until the system is commanded to adjust the percent rate for another area. (Default value is 25%.)

Water Patterns Menu

Press B at the Program Menu to access the Water Patterns Menu.

```
A>MANUAL VALVE OPERATION
B>ACTIVE PATTERN: Std. 201
C>CYCLE TIME BASE: 60 (10-300)
```

Press A for Manual Valve Operation.

```
WATER VALVES
BANK:      123456890
           101010101
      ON=1 OFF=0
```

Operation:
A- Using arrow keys 4 and 6 on the numerical keypad, move the cursor left or right.
B- From the numerical keypad, press 1 for “On or 0 for “Off” to turn valve banks on or off.

Press B to toggle the Active Water Pattern. Choose from the following water pattern programs:

Std.- Standard Program - Applies 1 to 10% more water than the application depth that is set at the main operator panel. This program is available on all systems.

Eco.- Economy Program - Applies 1 to 10% less water than the application depth that is set at the main operator panel. This program is available on all systems.

Custom - Custom Program - Provides a customized application rate based on the field position and 9500CC swing angle position. This program requires the 9500CC Processor Panel and BOSS panel are connected by the Communications Link. This program can be selected after the Training Rotation is completed and the Custom Program is uploaded into the 9500CC processor.

Off- Turns the programs off. This program is available on all systems.

Press C to set the Cycle Time Base (10 to 300 seconds) for the water application. The default and recommended setting is 60 seconds.

Steerable Setup Menu

Press C at the Program Menu to access the Steerable Setup Menu.

```
STEERABLE SETUP MENU:
A>SETUP
B>ANTENNA              E>GPS GUIDANCE SETUP
C>SWING ANGLE          F>GUIDANCE TYPE
```

Press A for SETUP.

```
SETUP MENU:
A>SWING ARM LENGTH: 201 FT
B>SWING ARM POSITION: LEAD
```

Operation:
A - SWING ARM LENGTH: Toggle between the two choices of Corner Span length; 201 or 179 feet.
B - SWING ARM POSITION: Toggle between a Lead or Lag system.

- Lead is defined as the swing arm being on the right side of the main system. If the main system is running forward, the swing arm is leading.
- Lag is defined as the swing arm being on the left side of the main system. If the system is running forward, the swing arm is lagging.

Press B from the Steerable Setup Menu for Antenna Setup.

```
ANTENNA SETUP MENU:
A>MAX +/- 0.10V              E>MIN PROGRESS 04
B>60 Hz
C>CHECK EVERY 5.0 sec.
```

Operation:
A- MAX. STEERING RANGE: This is the range where the system will not steer (from +/- 0.01 to 1.00 volts). If the antenna offset voltage range is being maintained at a certain value (default is +/- 0.10V), the system will not steer.
B- STEERING TIME: Scales the amount of time the steering motor will operate during a steering correction (between 1 Hz and 120 Hz) See the following example and formula. (Default setting is 60 Hz.)
C- STEERING CORRECTION CHECK INTERVAL: The system will check for a steering correction every number of seconds as programmed (default value is 5 seconds).
E- MIN. PROGRESS: If the system has made progress towards 0 volts offset, since the last steering operation, the system will not make any further steering adjustments, even if the offset is greater than the Maximum Steering Range. (4 = 0.01V, 8 = 0.02V, ...) (The default value is 04.)

The steering function is only based on the leading antenna. For example, if the system is moving forward, then the offset of the forward antenna is used to determine how often and by how much to steer. The system will not activate and run the steering motor for more than a maximum of two seconds at one time. The formula for calculating the duration of a steering pulse is: ((current offset ÷ 0.05 Volts) x 0.2 seconds) x (Steering Tower VFD Hz ÷ Steering Time Setting)

Example:
Current Offset = .12 Volts
Steer Tower VFD Hz = 120 Hz
Steering Time = 60 Hz

((0.12 ÷ 0.05) x 0.2) x (120 ÷ 60) = 0.96 seconds

This rounds out to the nearest tenth of a second so the system will steer for one second.

Press **C** from the Steerable Setup Menu for Steerable Angle Setup.

```
SWING ANGLE SETUP MENU:
A>LOW DEG: 0°          E>LOW VOLTAGE: 1.00V
B>HIGH DEG: 248°       F>HIGH VOLTAGE: 5.00V
C>OFFSET DEG: 0.0°   G>AT 90°   H>AT 180°
```

Operation:
A- LOW ANGLE: This is the low angle of the swing angle potentiometer, set between 0 and the High Degree Angle setting (default is 0).
B- HIGH ANGLE: This is the high angle of the swing angle potentiometer, set between the Low Degree Angle setting and 360 (default is 248).
C- OFFSET DEGREE: This is the difference between the swing arm's true 0° location and the 0° location of the potentiometer, this can range between 0 and 359.9 degrees.
E- LOW VOLTAGE: This is the low voltage setting for the swing arm potentiometer that ranges between 0 and 5 volts (default is 1.00V).
F- HIGH VOLTAGE: This is the high voltage setting for the swing arm potentiometer that ranges between 0 and 5 volts (default is 5.00V).
G-AT 90: After parameters A,B,E and F have been established and the swing arm is perpendicular (swing angle equals 90°) to the main system, pressing this key will determine the correct value for the Offset Degrees parameter.
H-AT 180: After parameters A,B,E and F have been established and the swing arm is in line with the main system (swing angle equals 180°), pressing this key will determine the correct value for the Offset Degrees parameter.

Press **E** from the Steerable Setup Menu for GPS Guidance Setup.

More about GPS Guidance is found later in this section. Contact a Lindsay Dealer for GPS setup.

Press **F** from the Steerable Setup Menu to choose between a Buried Wire Guidance or GPS Guidance system.

Pivot Setup Menu

Press **D** from the Program Menu for BOSS Menu information (read only).

```
BOSS DATA MENU:
POSITION: 353 (1006)
RATE:     100.00%
PRESSURE: 0
```

Ranges:

Position:	0-359° (0-1023)
Rate:	0-100%
Pressure:	0-99

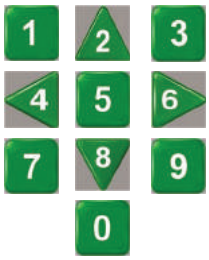
Event Log Menu

Press E from the Program Menu to access the Event Log Menu.

```
10/22      07:59AM E-PIVOT VFD COMM.
10/22      07:58AM W-STEERABLE VFD COMM.
10/22      07:58AM W-PIVOT VFD COMM.
(02,03,04) A>CLEAR HISTORY                ↓
```

Operation:

1. Using the numerical keypad, press:
   - 2- To **scroll up** through the list one entry at a time.
   - 8- To **scroll down** through the list one entry at a time.
   - 3- To **scroll up three** entries at a time (page up).
   - 9- To **scroll down three** entries at a time (page down).
   - 1- To **scroll back to the beginning** of the list (home).



2. Events preceded by the letter “I” are informative messages.

I- POWER ON	The system was powered up at this time.

3. Events preceded by the letter “E” are error messages and will cause system shutdown.

E- ANTENNA REFERENCE	Antenna Reference occurs when the reference voltage of the leading is less than 1.5V or greater than 2.5V.
E- ANTENNA OFFSET	Antenna Offset occurs when the antenna offset voltage is greater than the antenna reference voltage of the leading antenna.
E- SWING ANGLE	Swing Angle occurs when the swing angle is less than 15° or greater than 167°.
E- KEYPAD	Keypad error occurs when a key is continually pressed for more than 30 seconds.
E- PIVOT VFD ERROR	Indicates a Non-resetable error has occurred in the Pivot Variable Frequency Drive.
E- STEERABLE VFD ERROR	Indicates a Non-resetable error has occurred in the Steerable Tower Variable Frequency Drive.
E- STALL TIMER	The internal stall timer has timed out and shut the system down.
E- OPERATOR SHUTDOWN	The system was shut down manually.

4. Events preceded by the letter “W” are warning messages.

W- TWIST	Indicates the twist safety was activated.
W- DISPLACEMENT	Indicates the displacement safety was activated.
W- HUMP	Indicates the hump safety was activated.
W- FWD ROD SAFETY	Indicates the forward rod safety was activated.
W- REV ROD SAFETY	Indicates the reverse rod safety was activated.
W- PIVOT VFD COMM	A warning that the Pivot Variable Frequency Drive did not respond after five consecutive packet requests but the microprocessor did not shut the system down.
W- STEERABLE VFD COMM	A warning that the Steerable Tower Variable Frequency Drive did not respond after five consecutive packet requests but the microprocessor did not shut the system down.

Clock and Timers Menu

Press F from the Program Menu to access the Clocks and Timers Menu.

```
CLOCK/TIMERS MENU:   WED 10/22/01  01:17PM
A>SET DATE
B>SET TIME
C>TIMERS
```

Press A to access the Set Date Menu.

```
1-SUN   2-MON   3-TUES   4-WED
5-THU   6-FRI   7-SAT
ENTER CURRENT DAY _
```

Use the numerical keypad to select the day of the week as shown on the screen. (Ex. Monday would be selected by pressing the 2 button.) Press Enter to accept the selection.

Use the numerical keypad to enter the day month and year. Press Enter after each entry. When finished, the program will return to the Clock and Timers Menu.

Press B to access the Set Time Menu.

```
WED 10/22/03  _ _:_ _PM
```

Use the numerical keypad to enter the hour and minutes for a standard 12 hour clock. Press Enter after each entry. When finished, select A to toggle between AM or PM.

```
WED 01/24/01  01:46PM

A>TOGGLE AM/PM
```

Upon selecting the time of day, the program will return to the Clocks and Timers Menu.

Press C to access the Timers Menu. This screen displays the runtime hours and water pattern hours.

```
RUNTIME          109:06:00
A>PATTERN 1:    0.0  C>PATTERN 3:    0.0
B>PATTERN 2:    0.0  D>PATTERN 4:    0.0
SELECT TIMER TO CLEAR
```

The timers for the patterns are display only and can not be edited from here. However, by using the menu keys, selecting a given letter representing a pattern will clear the timer and restart the counter the next time the water pattern activates.

Options Menu

Press G to access the Training Menu.

```
BOSS CURRENT POSITION: 122° (348)

TRAINING PERCENT COMPLETE: 100.0%
A>START TRAINING    ENTER PASSWORD: _____
```

For Lindsay Dealers and Service Technicians, use the numerical keypad to enter a password and press A to start the training process.

Diagnostics Menu

Press H to access the Diagnostics Menu.

```
DIAGNOSTICS MENU:          E>COM. 1 MONITOR
A>CHECKSUM                 F>COM. 2 MONITOR
B>COM. COUNTERS            G>COM. 3 MONITOR
C>LOG EVERY 60 SEC.        H>COM. 4 MONITOR
```

Press A to display the Checksum Menu.

```
ZIMMATIC MAXFIELD PROGRAM
     VERSION = 1.00
   DATE/TIME = DEC 02 2003, 09:32:34
    CHECKSUM = 004065EF
```

This displays the current version of software installed, date and checksum

Press B to display the Com Counters Menu.

```
COM 1 - RX: 0000000000   OV: 0000000000
        TX: 0000000000   PE: 0000000000
                         FE: 0000000000
A>CLEAR COUNTERS                      ↓
```

This displays information received over the four communication ports. User the and keys from the numerical keypad to scroll up or down the list of communication ports available and view each one.

Operation:

1. Press A to clear counters.
2. From the Diagnostics Menu, press C to display the Log Every 60 Sec. Menu.
3. Use the numerical keypad to change the logging timer to a desired number of seconds. Press Enter to accept the changes.
4. From the diagnostics menu, pressing one of the letters corresponding to a Com. Port will display the data for that Com. Port in ASCII format.

GPS Swing Angle Verification

IMPORTANT! Swing Angle verification must be performed by Lindsay Dealer before beginning validation. Confirmation that the swing angle assembly is functioning properly must be done before validation can begin. Failure to perform this step prior to validation can result in validation having to be repeated. Refer to Installation manual 1239670 for more information.

GPS Validation and Swing Angle

During validation, the safety board will be recording the swing angle for given positions. The safety board will also check to see if the swing angle varies up to 20 degrees for two sectors of travel. (The field is divided into hundreds of sectors.) If this variation does occur, the validation process will be paused and the Main Menu will show a “Swing Angle Fault” error. This must be fixed and the pause timer reset (use menu keys in sequence C,E,E, Escape) before attempting the validation again.

At the Program Menu press C to access the Steerable Setup Menu.

```
STEERABLE SETUP MENU:
A>SETUP
B>ANTENNA              E>GPS GUIDANCE SETUP
C>SWING ANGLE          F>GUIDANCE TYPE
```

Press E to display the GPS Guidance Setup Menu.

```
GPS GUIDANCE MENU:
A>SETUP
B>PATH VALIDATION    D>MORE OPTIONS
C>GPS GUIDANCE LOG   E>RESET PAUSE
```

Press E to display the Reset Pause function.

```
These have been reset: Coast Distance,
Pause Distance, Pause Time,
Stuck Detection, Jump Detection
(press ‘ESC’ to continue)
```

Press Esc. to accept the changes and return to the Main Menu.

Pivot System Auto-Reverse Points Cleared to GPS

At the Main Control Panel, clear out all Auto-Reverse and Auto-Stop points that are programmed in the system. Refer to the Main Control Panel Operator's manual for this pivot for more details and steps on how to do this.

GPS Base Position Check Prior to Validation

Once the path file has been loaded into the system, a Path Pivot Position Check must be performed (not a Base Pivot Position Check). This "Distance" check can be done by pressing the sequence of menu keys: C,E,D,A,8.

If this "Distance" number is greater than three meters, then the field should be re-surveyed and a new path file uploaded to avoid nuisance failures over time.

Specifically if the number, plus an additional three meters (for added margin) is greater than the Base Position Tolerance (in meters) found in the configuration file, then the system may not start up reliably. The reasoning is the Base Position reading can vary and if it wanders further away from the path center point than that of <BasePositionToleranceMeters> then the system will not operate.

GPS Base Position Check Process

At the 9500CC Panel, access the Base Menu and observe the value under the Distance parameter. This needs to be less than three meters. If not:

- Re-Survey the base position with more accurate GPS or use the one reported by the GPS Base system.
- Regenerate the path file.
- Reload the path file.
- Continue with validation.

GPS Distance Configuration

Access the GPS “Distance” Parameter:

At the Main Menu, press to C access the Steerable Setup Menu.

```
STEERABLE SETUP MENU:
A>SETUP
B>ANTENNA              E>GPS GUIDANCE SETUP
C>SWING ANGLE          F>GUIDANCE TYPE
```

Press E to access the GPS Guidance Setup

```
GPS GUIDANCE MENU:
A>SETUP
B>PATH VALIDATION      D>MORE OPTIONS
C>GPS GUIDANCE LOG     E>RESET PAUSE
```

Press D to access More Options.

```
GPS GUIDANCE More Options:
A>BASE GPS             D>GUIDANCE
B>ROVER GPS            E>SAFETY
C>TARGET               F>DIAGNOSTICS
```

Press A to display the Base GPS.

```
BASE GPS RECEIVER
Pos: ###.#######°S, ##.#######°W, NONE
HDoP: ##.# Est. Accuracy: ####.# cm.
Time: ########.# Stats:0 ALT:-###.## m
```

Press 8 on the numeric keypad to advance to the next screen.

```
Base Receiver Communicating? Yes
Firewire ID OK? YES        Acquired Pos? No
Position Ok? No            Configured? No
Distance = ######.## m     A>Reconfigure
```

This distance number should be less than 3.00 meters.

9500CC Limitations

Zimmatic 9500CC is a well-designed system. To receive the benefits of this operating and safety features designed into this system, the following limitations need to be observed.

Wire Layout Limitations

Underground guidance wire layout and specifications provided in the installation manual are to be used for design and installation of the guidance wire. Installing the guidance wire outside of Lindsay's design parameters may cause uneven distribution of water.

Note: Lindsay Manufacturing Company will not be responsible for situations that arise from having wire buried beyond the limits established by Lindsay.

Wheel Track Establishment

Wheel track establishment procedures should be followed at the beginning of the season before the crop is 6" in height and/or after any tillage operating that destroys the track. On the first pass, apply a maximum of 1/4" of water. Allow wheel track to dry and harden before applying more water. Depending upon soil type, a second pass, applying 1/4" of water may be necessary to harden the wheel track. Allow wheel track to dry and harden before continuing with normal irrigation schedule.

Wheel Track Limitations

The depth of wheel tracks must be no greater than 4-6". The owner should be prepared to rework tracks when greater depths occur. This may require the filling or discing of tracks during the irrigation season to maintain these limits.

When operating the corner system on a full circle field or when auto-reversing is not being used, it is advisable to operate the corner in the direction that will keep the corner system ahead of the main system and on dryer ground when passing through the tucked mode. This procedure is beneficial in reducing the depths of the corner wheel trakcs. Using this procedure on the first pass of the irrigation season also helps in establishing wheel tracks.

When the system is designed to allow steerable tower tracks to cross the last track of the main system during extension and retraction, operational problems can result depending on system design, soil types, and irrigation management practices.

Ridge Limitations

Ridges in excess of 6" high may have to be removed for reliable operation. This can be accomplished by discing wheel tracks or similar practices.

Watering Limitations

Due to the variations between the fully extended or fully retracted operating modes, pressure regulators are recommended. Systems without pressure regulators will provide less than desired uniformity of water applications.

Due to sprinkler overlap requirements, operating at percentages greater than 80% can cause an uneven water pattern. Chemigating with the 9500CC requires a variable flow injection pump.

9500CC Design Limitations

The 9500CC System consists of a 6-5/8" diameter by either a 179' or 201' long span with an 88' overhang.

The main machine design can utilize pipe diameters of 10", 8" or 6-5/8" to accommodate friction loss and flow rates. Howver, the last span of the main system must be of 6-5/8" pipe diameter. This is to accommodate the 6-5/8" pipe diameter of the corner span.

With the corner span fully extended on the 179’ span, the end of the overhang will extend 258’ beyond the last tower of the main system. With the 201’ span, the end of the overhang will extend 280’ beyond the last tower of the main system.

The main system must be designed using span length combinations which fit the field dimensional limits.

The main system must also adhere to slope and soil limitations of the various spans for the field conditions involved.

A 15’ clearance must be maintained between the field boundary and the last tower of the main system wheel track.

A minimum of 15’ clearance from the steerable tower structure to the field boundary is required under normal conditions, but a minimum of at least 50’ clearance is required when power lines are invovled. Check with the power company serving your area for assistance in determining the minimum clearance from power lines.

The main system must be no less than 500’ in length and no greater than 2000’ in length.

Pressure at the end of the 9500CC System fully extended, and with no end gun, must be 20 psi minimum.

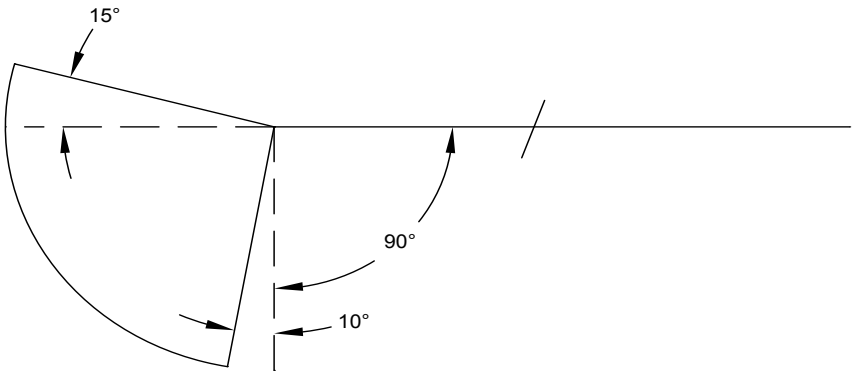
Pivot pressure with the 9500CC System fully retracted, must not exceed 110 psi maximum.

The 179’ 9500CC System can only be installed on grades of no greater than 15% and the 201’ system on grades of no greater than 12%.

Minimum Speed Limitation

The minimum speed of the system should be set no lower than 15%.

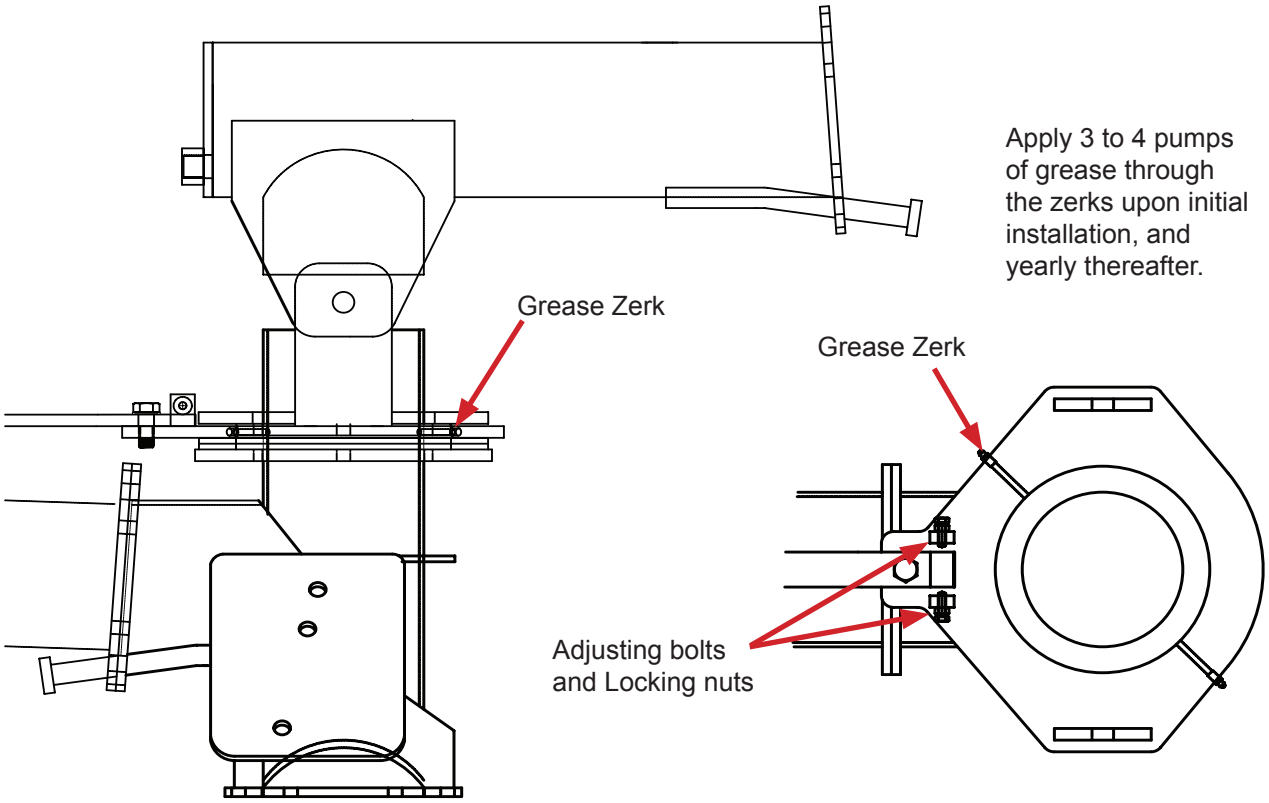
End Gun Arc Setting



Note: When operating a corner system on a full circle field or when auto-reversing is not being used, operate the system in the reverse mode. This will keep the corner system ahead of the main system and on dryer ground when passing through the tucked position. This will help in reducing the depth of the corner wheel tracks.

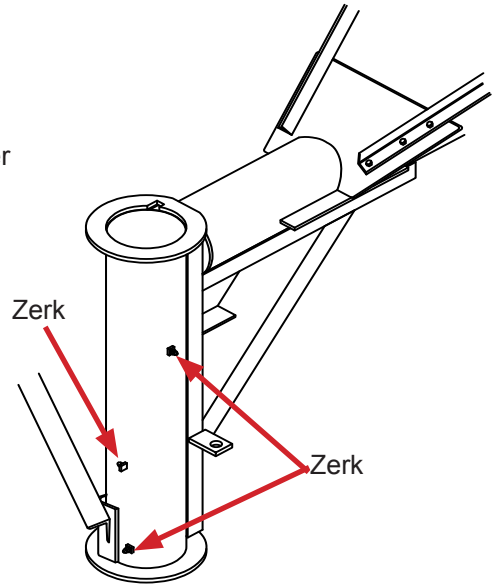
Section 2–Maintenance
Last Tower Joint Assembly

Three grease zerks are located as shown below. These should be greased once a year or every 1,000 hours (whichever occurs first.) Use a multi-purpose grease.



H-Frame

Three grease zerks are located on each vertical tube of the H-Frame. These should be greased once a year or every 1,000 hours (whichever occurs first.) Use a multi-purpose grease.

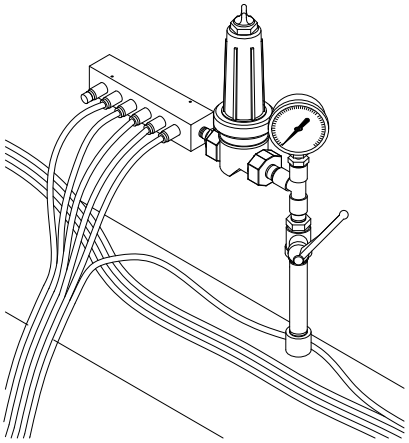


Flushing and Draining

Remove the sand trap cap and pump water through the system to flush out any foreign material that may be in the pipeline. This should be executed at the end of each season. Allow the water to pump through the system for several minutes. Also, check the drain at each tower to make certain that all the water is draining correctly and efficiently. Remove plugs in the check valve located at the pump if used. If the system is subject to freezing, drain the mainline to the pivot.

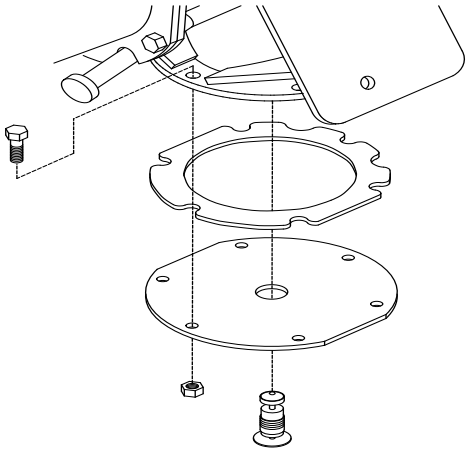
Pilot Line Filter

Check the pilot line filter twice a year unless otherwise specified for the operating conditions. Be sure it is free of water at the end of the season.



Last Tower Assembly Drain

Use a Wade drain on the last tower joint. If a plug or ball valve are used instead (optional), this joint must be drained at the end of the season.



Gear Oil
(Worm Drive Gearboxes and Center Drive Gearmotors)

Prior to Initial Start-Up:

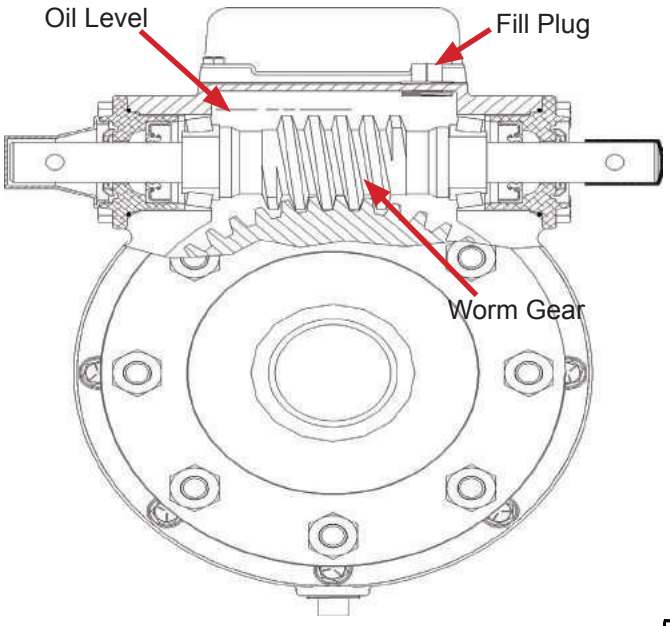
- Check the oil level on the worm drive gearboxes and the center drive gearmotor. (See details below.)

Changing the Gear Oil:

- Change the gear oil in both the worm drive gearboxes and the center drive gearmotors at the end of the first operating season, as well as every 4 years or 4,000 hours (whichever occurs first.)
- **Oil must be replaced with genuine Zimmatic gear oil.**

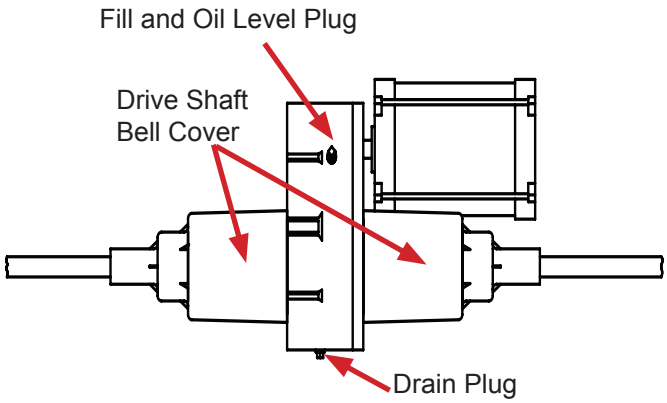
Annually:

- Check the oil level on the worm drive gearboxes and the center drive gearmotor. (See details below.)
- Drain any condensation that may have accumulated at the bottom of the gearboxes during the season.
- Inspect all seals for signs of wear. Seals with any indication of wear should be replaced.
- Models with seal drain holes on the endcaps should be opened and free of debris.

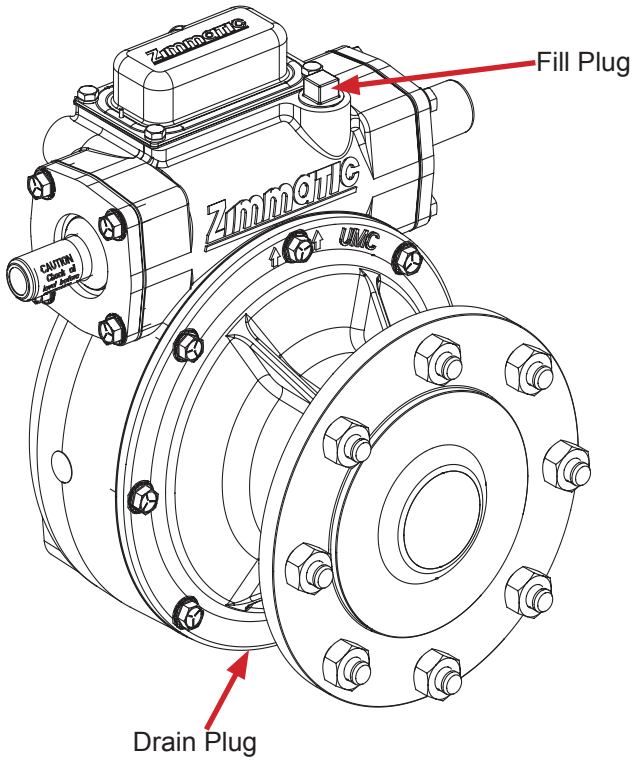


Gear Box

Gear Motor



WARNING:
Replace drive shaft covers before operation. Failure to do so can result in serious injury. Oil seals can also become damaged due to crops wrapping around the drive shaft.



Notice:

Only fill the gearbox using the plug. (See detail.) Do not use the drain plug to fill. The oil level should be between the top of the worm gear and the bottom of the fill tube. Be certain to not overfill as overfilling can create excessive internal pressure that can lead to oil seepage through seals causing potential seal damage.
Use only Zimmatic Gear Oil 85W-140, GL5 (approximately 1 gallon per box) P/N 11-3131-7. Do not use any other grade weight or grade of oil as it can reduce the life of the gearbox.

Center Drive Gearmotors:

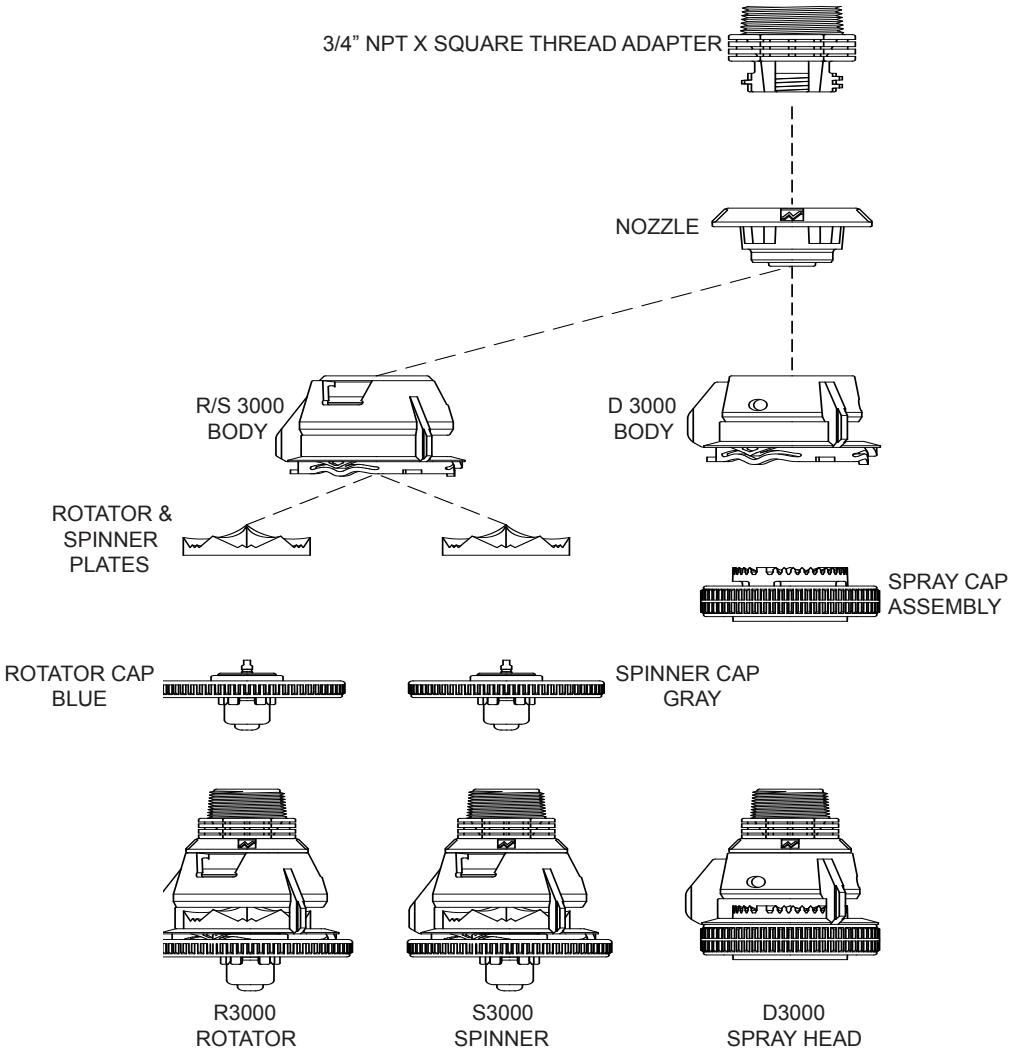
Using one of the following Zimmatic Gear Oils, fill to the top of the oil level/fill plug:
Gear Oil 20W, GL-4 (P/N 06-4767-7)
Gear Oil 80W-90, GL-4 (P/N 06-4765-1)
Gear Oil 85W-140, GL-5 (P/N 11-3131-7)

It is dependent upon operating conditions so contact a local Lindsay deal for recommendations. Center drive gearmotors are shipped with 20W, GL-4 oil (0.83 gallon per unit.)

Low Pressure Sprinklers

For low pressure sprinklers, check for wear on the nozzle. If a nozzle has indication of wear, it can cause excessive flow and poor depth uniformity. Also check for excessive wear on the spinkler plates which can cause water pattern distortion and hinder the sprinkler uniformity.

Check the cap mechanisms to make sure they are rotating or spinning properly. If the system is equipped with regulators, check for debris in the inlet. Finally, make sure all fittings and components are tightly connected.

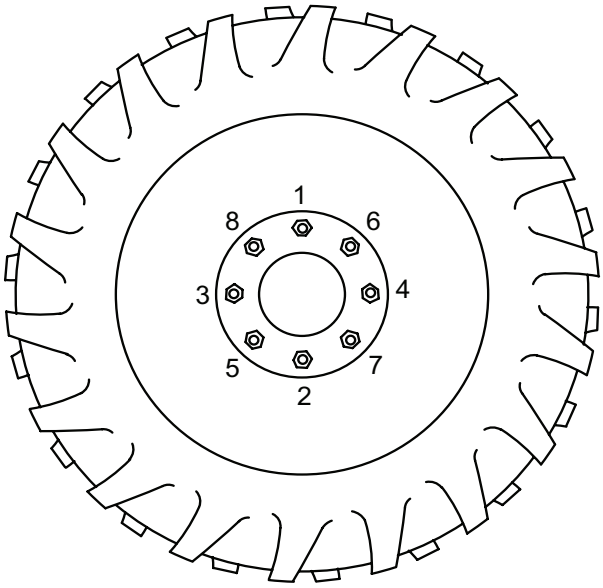


Tires

If more flotation is desired, the tire pressure can be lowered but do not lower more than 16 psi (1.1 bar.) However, at tire pressures lower than what is recommended, the rim may slip and cause the tire to lose all air pressure. Always check air pressure in the tires before operating. Refer to the Specifications Section at the beginning of this manual for recommended tire pressures.

It is recommended that the lug nuts be tightened across from each other in the order show below. Torque lug nuts to 120 lbs/ft (162.70 N/m).

Note:
On new systems, check to see that the lug nuts are tight after one or two passes over the field. After this is performed, check the lug nuts regularly.



WARNING:
See General Safety Section for safety precautions when inflating tires.

WARNING:
When performing any maintenance to tires and wheels, the system must be shut off with Lock-Out/Tag-Out procedures in place. Refer to General Safety Section.

Lindsay does not recommend the use of wheel assemblies that are not approved by Lindsay for use on all Zimmatic systems. The use of any non-Lindsay approved wheel assembly may void the warranty on Zimmatic systems if Lindsay determines failure was due to the use of the non-approved wheel assembly.

Periodical Maintenance Checklist

All of these checks should be performed at the start of the growing season before irrigating, then periodically according to the following chart.

Check Point	Inspection Frequency		
	Annually	Every 6 Mo.'s	Every 3 Mo.'s
Grease pivot point between pivot ell and head weldment		✔	
Grease Steering Spindles and U-Joints	✔		
Inspect all seals for signs of wear and leaks	✔		
Check oil levels on gearboxes and center drive motors		✔	
Drain condensation out of gearboxes	✔		
Check tire pressure (must be less than 16 PSI)			✔
Check for loose lug nuts on wheels			✔
Check for worn or missing sprinkler heads	✔		
Inspect barricades for damage	✔		
Check the collector ring for dust buildup or corrosion	✔		
Remove sand trap and flush the system for several minutes	✔		
Check motor drop cable connections	✔		
Check panels for rodent or insect nests	✔		
Ensure the pump shutdown is operating correctly	✔		
Check the bare copper grounding wire to the ground rod is secure	✔		
Check tie-downs and turnbuckles are tight	✔		
Check the span cables are secure	✔		
Tighten loose tower or span bolts	✔		

Revisions				
Date	**Revision**	**ECN**	**Published ECN**	**Description**
4/15/2015	A	33368	33368	Reformatted
5/9/2016	B	34225	34225	Updated Compliance Spec's and Certificates